IN THE CLAIMS

This listing of claims replaces all prior versions, and listings, in this application.

Claims 1-5 (canceled)

6. (currently amended) An isolated polynucleotide encoding a synthase or transferase comprising:

(a) the nucleic acid sequence of SEQ ID NO:5; or

(b) a nucleic acid sequence having at least [[80]] 95% identity to SEQ ID NO:5 and encoding a polypeptide ~~obtainable~~ from a bacterium of the family *Mycobacteriaceae* using adenosyl-GDP-cobamide as substrate for the ~~and being involved in~~ biosynthesis of vitamin B12; or

(c) a nucleic acid sequence encoding the polypeptide of SEQ ID NO:6; or

(d) a nucleic acid sequence which hybridizes under high stringency conditions of ~~including hybridization in~~ 0.3 M sodium chloride and 0.03 M sodium citrate at 60°C to a sequence as defined in (a), (b), or (c)~~; or~~

[[(e)]] ~~a sequence that is degenerate as a result of the genetic code to any one of the sequences as defined in (a) to (d)~~.

Claim 7 (canceled)

8. (currently amended) The polynucleotide according to claim 6 which comprises:

(a) ~~a sequence that encodes a polypeptide having synthase or transferase activity, which is:~~

(1) the coding sequence of SEQ ID NO:5 or [[;]]

(2) a sequence which hybridizes under high stringency conditions of ~~including hybridization in~~ 0.3 M sodium chloride and 0.03 M sodium citrate at 60°C to the complement of the sequence defined in (1); or

[[(3)]] ~~a sequence that is degenerate as a result of the genetic code with respect to a sequence defined in (1) or (2); or~~

(b) a sequence complementary to the coding sequence of SEQ ID NO:5 ~~a polynucleotide defined in (a)~~.

9. (previously presented) The polynucleotide according to claim 6 which is a DNA sequence.

10. (previously presented) A vector comprising one or more polynucleotide sequence(s) according to claim 6.

11. (previously presented) The vector according to claim 10 which is an expression vector.

12. (previously presented) An isolated host cell which comprises at least one polynucleotide according to claim 6, or has multiple copies of one or more of the polynucleotide(s).

13. (previously presented) An isolated host cell which comprises, as a heterologous sequence, a polynucleotide according to claim 6.

14. (currently amended) An isolated prokaryotic host cell~~, optionally prokaryotic,~~ transformed with a vector comprising the polynucleotide according to claim 6 ~~or a vector comprising the polynucleotide~~.

15. (currently amended) A process of producing or synthesizing a polypeptide ~~or vitamin B_{12} or a precursor thereof~~, comprising:

(a) culturing a host cell as defined in claim 12 under conditions that provide for expression of the polypeptide ~~or synthesis of vitamin B_{12} or a precursor thereof~~ and

(b) isolating said polypeptide ~~or said vitamin B_{12} or said precursor thereof~~.

Claims 16-28 (canceled)

29. (withdrawn) The vector according to claim 10 which further comprises:

(a) a polynucleotide encoding a polypeptide wherein said polypeptide has the amino acid sequence of SEQ ID NO:4 or has at least 95% identity to the amino acid sequence of SEQ ID NO:4, or the nucleic acid sequence SEQ ID NO:3; and

(b) a polynucleotide encoding a polypeptide wherein said polypeptide has the amino acid sequence of SEQ ID NO:6 or has at least 95% identity to the amino acid sequence of SEQ ID NO:6, or the nucleic acid sequence SEQ ID NO:5.

30. (withdrawn) The vector according to claim 10 further comprising a nucleic acid sequence encoding a CobA protein.

Claims 31-32 (canceled)

33. (withdrawn) The vector according to claim 11 wherein the polynucleotide is a DNA sequence operably linked to a regulatory sequence.

34. (withdrawn) A process for the preparation of an amine, comprising contacting a substrate with a host cell as defined in claim 12.

35. (withdrawn) A process for the preparation of a phosphate-containing compound, comprising contacting a substrate with a host cell as defined in claim 12.

36. (withdrawn) A process for the preparation of a nucleotidyl-containing compound, comprising contacting a substrate with a host cell as defined in claim 12.

37. (withdrawn) A process for the preparation of an aryl-containing compound, comprising contacting a substrate with a host cell as defined in claim 12.

38. (withdrawn) A process for the preparation of an adenosine-containing compound, comprising contacting a substrate with a host cell as defined in claim 12.

Claim 39 (canceled)

40. (withdrawn) The vector according to claim 10 which further comprises:

(a) a polynucleotide encoding a polypeptide wherein said polypeptide has the amino acid sequence of SEQ ID NO:4 or has at least 95% identity to the amino acid sequence of SEQ ID NO:4, or the nucleic acid sequence SEQ ID NO:3; and

(b) a polynucleotide encoding a polypeptide wherein said polypeptide has the amino acid sequence of SEQ ID NO:6 or has at least 95% identity to the amino acid sequence of SEQ ID NO:6, or the nucleic acid sequence SEQ ID NO:5 and further comprising a nucleic acid sequence encoding the CobA protein.

Claim 41 (canceled)

42. (currently amended) The polynucleotide according to claim 6 which further comprises:

(a) the nucleic acid sequence of SEQ ID NO:3; or

(b) a nucleic acid sequence having at least [[80]] 95% identity to SEQ ID NO:3 and encoding a polypeptide ~~obtainable~~ from a bacterium of the family *Mycobacteriaceae* using adenosyl cobamide and/or adenosyl cobamide phosphate as substrate for the ~~and being involved in~~ biosynthesis of vitamin B12; or

(c) a nucleic acid sequence encoding the polypeptide of SEQ ID NO:4; or

(d) a nucleic acid sequence which hybridizes under high stringency conditions of ~~including~~ hybridization in 0.3 M sodium chloride and 0.03 M sodium citrate at 60°C to a sequence as defined in (a), (b), or (c)~~; or~~

[[(e)]] ~~a sequence that is degenerate as a result of the genetic code to any one of the sequences as defined in (a) to (d)~~.

43. (currently amended) A vector comprising one or more polynucleotide sequence(s) according to claim 42 ~~and wherein the vector optionally further comprises a nucleic acid sequence encoding a CobA protein~~.

44. (previously presented) An isolated host cell which comprises at least one polynucleotide according to claim 42 or has multiple copies of one or more of the polynucleotide(s).

45. (currently amended) An isolated prokaryotic host cell~~, optionally prokaryotic,~~ transformed with a vector according to claim 43.

46. (currently amended) A process of producing or synthesizing a polypeptide ~~or vitamin B_{12} or a precursor thereof~~, comprising:

(a) culturing a host cell as defined in claim 45 under conditions that provide for expression of the polypeptide ~~or synthesis of vitamin B_{12} or a precursor thereof~~ and

(b) isolating said polypeptide ~~or said vitamin B_{12} or said precursor thereof~~.

Claim 47 (canceled)

48. (previously presented) The isolated polynucleotide according to claim 6 encoding a polypeptide having cobalamin (5'-phosphate) synthase activity [EC 2.7.8.-].

49. (previously presented) The polynucleotide according to claim 42 wherein the further comprised polypeptide has cobinamide kinase activity [EC 2.7.1-] and/or cobinamide phosphate guanyl transferase activity [EC 2.7.7.-].

Claims 50-57 (canceled)

58. (previously presented) The vector according to claim 10 which further comprises:

(a) a polynucleotide encoding a polypeptide wherein said polypeptide has the amino acid sequence of SEQ ID NO:4 or has at least 95% identity to the amino acid sequence of SEQ ID NO:4, or the nucleic acid sequence SEQ ID NO:3; and

(b) a polynucleotide encoding a polypeptide wherein said polypeptide has the amino acid sequence of SEQ ID NO:6 or has at least 95% identity to the amino acid sequence of SEQ ID NO:6, or the nucleic acid sequence SEQ ID NO:5.

Claims 59-66 (canceled)

67. (new) The vector according to claim 43 further comprising a nucleic acid sequence encoding a CobA protein.